Space Planning in VectorWorks

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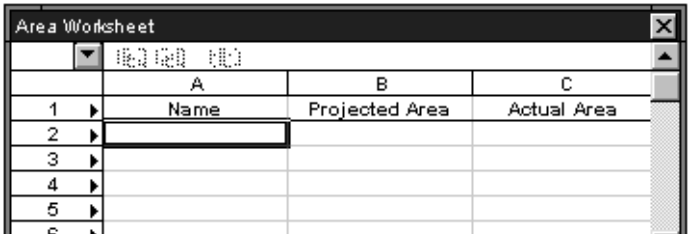
In architectural design, space planning, the efficient use of space in a design, is an important step of the design process. Efficient utilization of the available space helps to save time and money, in both the design and construction phases. This chapter explains how to use VectorWorks' worksheet function, templates, and VectorScript scripts to make efficient use of space in your designs.

Creating a space plan is actually a series of procedures, each with their own set of steps for generating the needed information. These steps include estimating the area for the spaces, creating an Adjacency Matrix, drawing the spaces on the plan, positioning the spaces, and finally creating the walls.

To begin an Space Planning drawing

1. From the File menu, select Workspaces and then **AEC**.
2. Choose **New** from the File menu.
3. Click **Document Template**.
4. Click **Space Planning**.
5. Click **OK**.
6. The Space Planning template opens in VectorWorks.

   An Area Worksheet is displayed with three columns.



ESTIMATING THE AREA

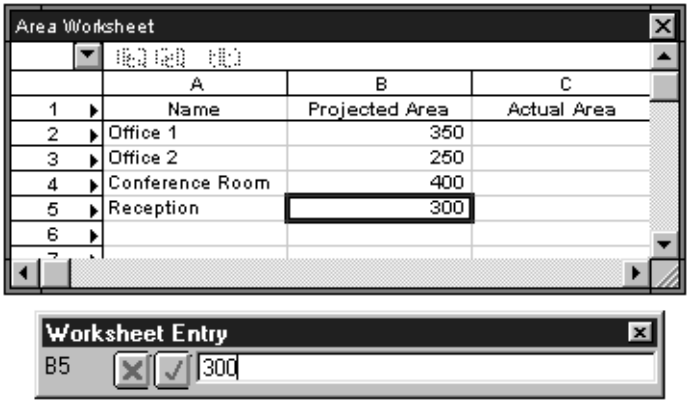
To create a space plan, you need to know the number of spaces needed and have a general idea of their sizes. You should also name each of the spaces with a unique name so they can be identified in the worksheet. Once created, you can change the plan as needed. The following procedures create the basic plan drawing.

To create an Area Worksheet

1. In the first column, fill in the names of the spaces you are going to develop.
2. In the second column, enter an initial square footage estimate.

   The numbers must be entered in the same units as those set for the drawing in the Set Units dialog box. The example shows the Projected Area column with values entered. Add more rows as needed.

Entering the Projected Areas into the Area Worksheet



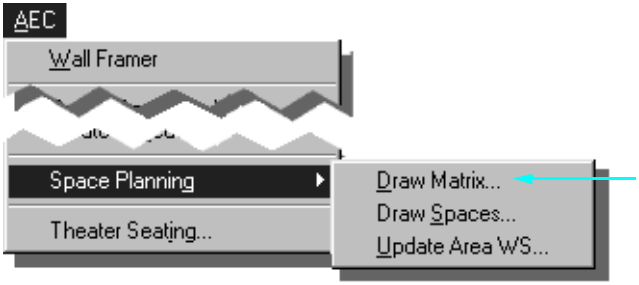
CREATING AN ADJACENCY MATRIX

Once you've determined the sizes of the various spaces that will be in your design, you need to arrange them. The program provides a command called Draw Matrix. This command creates a chart that helps you determine how spaces should be physically positioned relative to one another in a floor plan. This Adjacency Matrix is especially useful in large projects where complex interrelationships are more likely to be overlooked. This Adjacency Matrix uses the list of names from the Area

Worksheet with an arbitrary value assigned for each space. You need to review the values and change them as needed. These values will help you later in actually laying out the spaces. Once columns A and B of the worksheet are complete you can select the draw matrix command.

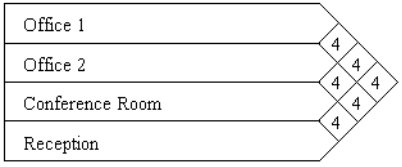
To create an Adjacency Matrix

1. From the AEC menu select Space Planning,and then Draw Matrix...



The command is executed using the information contained in the Area Worksheet.

The Adjacency Matrix is created in its own layer in a 1:1 scale.



Adjacency Matrix

The following table explains the meaning of the codes to be entered in the diamond boxes at each intersection of two spaces. The matrix on the right side of the chart is used to define relationships. A number is entered at the intersection of each pair of spaces indicating one of six kinds of relationships:

Code	Relationship
0	Same space.
1	Spaces must be adjacent.
2	Adjacency is preferred, but not absolutely necessary.
3	Anywhere nearby is fine.

Code	Relationship
4	Distance is not important.
5	Spaces should be far apart or in different buildings.

2. Evaluate the relationship required between the two spaces.

   Begin with the first space at the top of the chart.

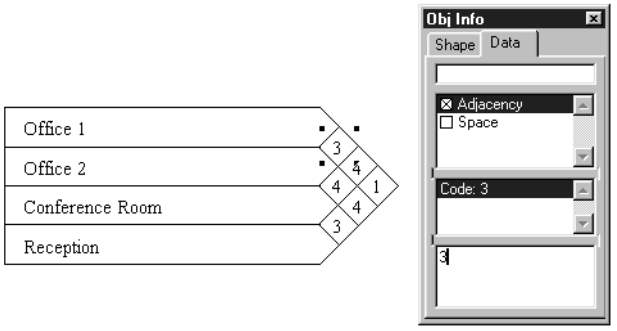
3. Select the relationship box at the intersection of the two spaces.
4. Select **Object Info** from the Palettes menu.

   The Object Info palette appears.

5. Click the **Data** tab.

   The Object Info palette repopulates to display the settings for the selected relationship box.

Assigning an Adjaceny Code in a Relationship Box



6. Change the default code numbers, if desired.

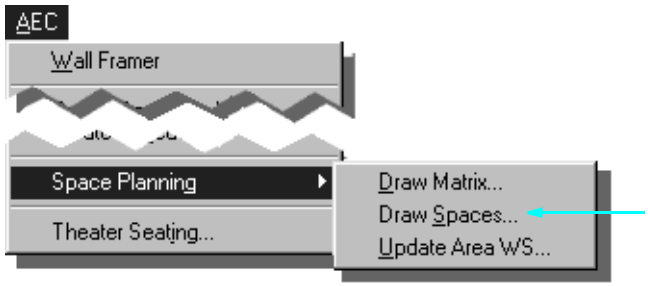
   The command assigns a value of 4 for each of the relationship boxes. To actually generate the matrix, change the values to the desired value, as needed. Select the number 4 in the Edit field of the Object Info palette, enter a new number, and press the Enter or Tab key. The new value is applied and the relationship box changes to display the new value. If several relationship boxes are selected, the value will apply to each selected box.

DRAWING SPACES ON THE PLAN

Once the list and the Adjacency Matrix are complete, the next step is to run the command that generates the spaces on the plan.

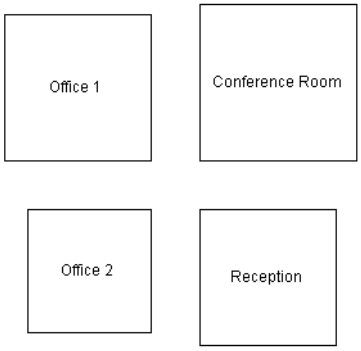
To generate spaces on the space plan

1. In the AEC menu from Space Planning, select Draw Spaces...



This command uses all of the information from the Area Worksheet to generate a a set of named square polygons in the document window. These polygons are used as a starting point for laying out the floor plan. The command draws each polygon spiraling from the middle of the page with a small space between each object. The command initially places each text label and polygon pair in a group, so that you can easily rearrange them into a rough layout.

Output After Running the Draw Spaces Command



2. Ungroup the polygons and text labels and edit, as desired.

   Ungrouped, the polygons are easier to edit, and the text labels are not modified as they would be in a group. Since text labels are not linked to ëthe worksheet, they can be deleted or moved without affecting the operation of the Update command.

3. Regroup any objects that were ungrouped and edited.

POSITIONING THE SPACES

The previous procedure generated a series of polygons, each labelled according to the Area Worksheet. The next step is to layout the spaces to fit the building's design. Use the information you generated in the Adjacency Matrix to help determine the location of each of the spaces. It's probably easier to start with the space for a central room or an entrance area and position the remaining spaces according to their adjacency listing in the Adjacency Matrix.

To position the spaces

1. Click the desired space.
2. Move the space to the desired location.
3. Click the space listed in the Adjacency Matrix as being next to the first space.
4. Position it accordingly.
5. Continue with each of the remaining spaces.

The polygons that are generated are only for estimating purposes and can be changed as desired. To change the shape of the polygon, ungroup the space and reshape it using the Object Info palette or the Reshape Tool on the 2D Tools palette. You also can replace the shape, if desired.

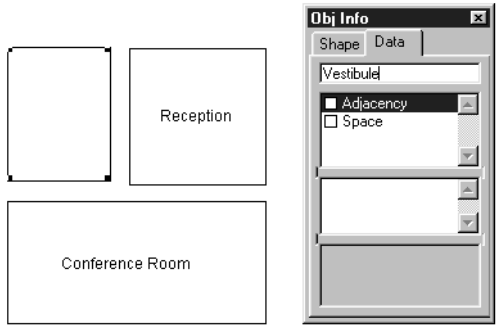
To change the shape of the spaces

1. Delete the polygon that the command made.
2. Draw the desired polygon to use with the Update Area Worksheet command.
3. Click the new polygon.
4. Click the **Data** tab of the Object Info palette.
5. Enter the name for the new shape in the Name field.

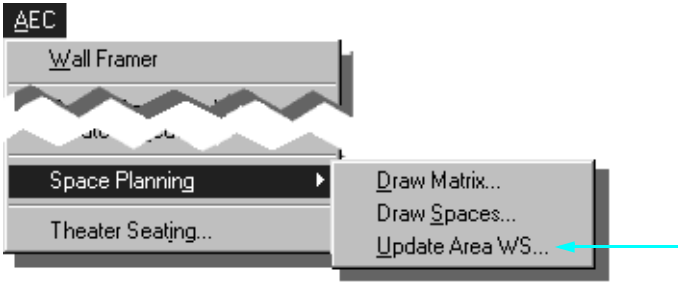
   Be sure to delete the command-generated polygon first. The name of the new shape must match the name of the old shape so that the VectorScript scripts will work. This allows you to use specialized shapes for the space plan.

The new space is added to the Area Worksheet and to the bottom of the Adjacency Matrix with the Update Area Worksheet command.

Naming a New Space in the Object Info Palette



6. From the AEC menu select Space Planning and then Update Area WS.



The Actual Areas column is filled with takeoffs from the active document window.

Area Worksheet After Running the Update Area Worksheet Command

Area Worksheet

	A	B	C
1	Name	Projected Area	Actual Area
2	Office 1	350	350
3	Office 2	250	250
4	Conference Room	400	517.46
5	Reception	300	300
6	Vestibule		230.48
7			

Use this information to compare the target square footages with the actual square footages in the document at various stages in the layout process.

CREATING WALLS

Once the layout of the spaces is completed, you complete the floor plan by creating the walls that will make up the spaces. Using the Wall Tool on the 2D Tools palette, trace the outline of the polygons, insert the appropriate door, window, electrical, and other needed symbols, and the floor plan is complete.

To create walls for space plans

1. Select **Show/Snap Others** from the Layer Options item in the Organize menu.
2. Create a new layer with the same scale as the Space Planning layer.
3. Select the **Wall Tool** from the Walls palette.
4. Define a suitable wall type, including height, thickness, and cavities, if any.
5. Trace the outline of each polygon.
6. Insert the appropriate symbols, as desired.